

# 2021 State of the Gear Industry

## Reader Survey Results

**Gear Technology's annual State-of-the-Gear-Industry survey polls gear manufacturers about the latest trends and opinions relating to the overall health of the gear industry.** As in years past, the survey was conducted anonymously, with invitations sent by e-mail to gear industry companies – primarily in North America, but also including some respondents from around the world. More than 200 individuals responded to the survey.

All of the responses included in these results come from individuals who work at locations where gears, splines, sprockets, worms and similar components are manufactured. They work at gear manufacturing job shops as well as captive shops at OEMs. A full breakdown of the respondent demographics can be found at the end of this article.

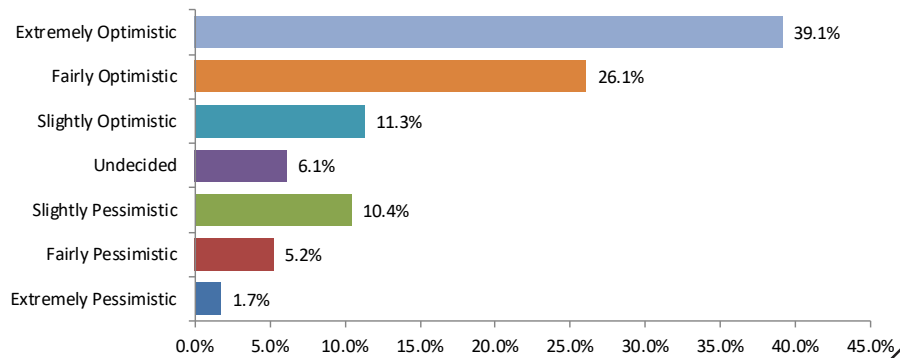
### Summary

Last year's survey was conducted before the COVID pandemic. This year's survey was conducted in mid-to late January. Both last year and this year saw historically low levels of optimism in the gear industry. In 2020, only 75% of gear manufacturing companies indicated some level of optimism about their company's ability to compete over the next five years (compared with 85.8% in 2019 and 83% in 2018 and 2017). What's surprising – after almost a full year of pandemic, economic and political turmoil – is that this year's numbers aren't significantly different overall. In fact, they're slightly improved, with 76.5% indicating some level of optimism.

The gear industry has always been a positive bunch, and they remain so even in the face of terrible conditions.

The gear industry faces significant challenges, the most obvious being the COVID pandemic. 39% of respondents cited COVID or the pandemic specifically when describing the most significant challenges facing their businesses, with many others citing the need for increased productivity, new sales development, general economic conditions and other factors that are indirectly related. As in past years, the need for finding, training and retaining skilled labor remains one of the biggest challenges our industry faces, with 21% of respondents listing some aspect of skilled workforce challenge. Here's a sampling of what's keeping the gear industry awake at night.

Please describe your level of optimism regarding your company's ability to compete over the next five years.



### What are your company's most significant challenges for 2020?

**Need for more capacity, without spending capital.**

**Government policies on environment will have tremendous impact on vehicle/equipment industry.**

**COVID.**

**Keeping suppliers abreast on the meeting requirements.**

**1. Restoration of the supply chain; 2. rebuilding customer trust (by breaking the supply chain); 3. Further reduction of operating costs.**

**US-China trade war and COVID-19 pandemic.**

**Becoming more efficient and improving delivery times.**

**Maintaining highest quality levels.**

**Demand shrinkage because of COVID.**

**Lockdown.**

**Increase in input material cost.**

**We have stayed about the same. When COVID hit we saw about a 10 percent drop in sales but now sales have returned.**

**Personnel.**

**Speed up the production.**

**Lockdown leading to high inventory, affecting cash flow.**

**Continue to satisfy the customer's needs although the pandemic forced all to have more limitations.**

**Just the economic challenge.**

**Stagnant commodity prices.**

**We are at the mercy of OEMs building gas turbine engines. As long as air travel is restricted, volumes will not increase.**

**Finding skilled labor.**

Head count reduction in response to pandemic closures make us more lean, despite volume demand outlook in 2021 is higher than ever. This presents significant challenge to meet the targets we have forecasted.

We want to expand export business .

Quality.

Hiring experienced engineers to replace those that are retiring this year and next.

Retaining top talent that is finding better opportunities in growing industries; connecting with new customers due to ongoing travel restrictions.

Lack of good employees.

Cost reduction, increasing efficiency.

Industry 4.0 projects.

Dealing with schedules from employees, customers and vendors. Nothing really ran smooth.

The most challenging part of 2020 was getting customers to take the parts they ordered. Or, to pay for the parts they accepted in a timely manner. The large OEMs clearly do not understand the impact they can have on small business. During 2020 we learned which customers had our backs and were willing to work with us during COVID and which did not. It was an interesting year and difficult lessons learned.

Increase productivity and throughput with the current workforce.

COVID-19 and availability of raw materials.

COVID sicknesses effecting workers.

COVID restrictions affecting customers.

Lack of proper labor force.

Keeping up with technology changes.

Maintaining sales and keeping the work force safe and working due to COVID.

COVID19.

For past year the biggest challenge was keeping the employees healthy; two colleagues left us!

COVID: working from home.

Projects have no fixed timeline or focus.

Introduction of Industry 4.0.

Electrification - Complex parts.

Improve quality and productivity in preparation for the next production expansion.

Adapt capacity.

Keeping the business running during COVID period; Management of manpower; the optimization of available funds. Maintain manpower, adjust to "new normal," maintain revenue generation to optimal level.

Ramping up.

Matching capacity vs. demand.

1. Restart after COVID lockdown; 2. Exponential growth in worldwide demand for gears; 3. Skilled manpower to match the current market demands.

Finding work and finding competent workers.

Loss of Sales.

Sino-U.S. relations & eu-china relations.

Finding qualified help, to replace someone retiring.

COVID-19.

Workforce Skilled Labor shortage.

New Business Development .

Keeping existing workforce healthy.

Installation of additional equipment and upgrading the software.

Being able to sustain the downturn till the economy picks up to 2019 levels.

Maintaining skilled workers in downturn in business.

Increase in healthcare costs and cost of living.

Shipping.

Finding niche markets that are not overwhelmed by cheap imports.

Our company is struggling to just keep our doors open since our sales were down more than 30% in 2020 over 2019.

Our plant has dealt with one COVID outbreak which caused us to shut down the plant for two weeks. Even with that, employees staggered back, so we were not at full production until about 4 weeks after the plant-wide shut down. This wreaked havoc on our schedule and deliveries to our customers.

Resources internally are spread very thin and there are many unknowns. We are hopeful sales will be up at least 10% over 2020.

There will still be a threat of COVID outbreaks, especially on the plant floor, though we have been using extreme precautions.

Improvements of soft power skiving; LPC heat treatment; Improvements of gear honing.

It is really hard to know. There is the usual, people... overall looking for the vaccine and for general life to get closer to normal.

Skilled Manpower.

We are machining parts which were previously done in a sister plant, which closed down last year. We are learning new equipment which was brought in from that plant and purchasing new tooling as a result.

COVID related issues.

Sourcing of parts as other manufactures decreased the size of their business and hours leadtimes, prices, and availability of parts all had challenges.

Maintaining a COVID safe working environment while producing parts.

Change to virtual contact.

Commercial aerospace decline, picking up new work in other various industries.

COVID-19 and finding skilled workers that are able to pass a drug test.

Massive steel price increases.

Skilled artisans in short supply.

Obsolete equipment.

Civil aerospace business being at a low level with fewer flight hours and fewer new planes.

Avoid financial loss with sales down 70% three of the last four quarters of 2020.

Maintaining manufacturing staffing. Outside process vendors reduced or limited capacity.

Having enough experienced engineers.

Maintaining employees while customers slowed orders during Q2&3. Decrease of revenue by 25% during that timeframe.

Being mainly dependent on the auto industry we can only plan in sync with them.

Reducing lead times.

Zero defects.

New product introductions, combined with high production volumes of current products, and shortage of staff due to COVID.

To stay ahead in Pandemic situation, workers issues and getting repeated orders from clients.

Cost reduction programs and automation and layout improvements.

**Productivity.**

The problem is a decreasing of economically active population. Growth of productivity through manufacturing automation, this is our sole solution.

Fluctuating workflow. Incoming orders have not been consistent, hard to evaluate future stability or need for additional employees or a possible need for layoffs.

Keep constant efficiency in a fluctuant capacity condition.

Finding people to train for low volume manufacturing.

Machine repair and recruiting people.

Keeping employees safe (mentally, physically and financially).

COVID shutdown based upon political situation.

Development of new projects (sales dept).

The Russia–Saudi Arabia oil price war killed oil prices in the beginning of 2020. We slowed because of that. And then COVID hit. We are a 3-man shop we have idled the shop and all of us are on unemployment.

**Reduced production.**

Finding qualified employees.

The pandemic.

Market conditions; Skilled people.

Finding experienced gear makers.

Visiting customers.

COVID and keeping people safe.

Keeping customers happy - price and delivery.

Hiring and keeping talented people.

**Management.**

The most significant challenge was adapting to the effects of the COVID pandemic without losing the vision of continued customer service.

**How has the COVID Pandemic affected your business?**

Minimal. One large customer has slowed significantly, but others have increased demand.

Severely.

No air travel.

Big impact.

It has impacted initially; however further trends are smoothing out.

Worse than during the outbreak of the economic crisis in 2008–2010.

Dramatically decreasing in the beginning, then uprising at the last quarter 2020.

Not at all - all systems go.

It affected during starting period but revived later in the year.

Our market shrank.

Caused reduction in sales.

Strongly.

Mainly postponed the deliveries of equipment to some customers and limited new orders.

Very strongly in all of our departments: design and construction, sales, manufacturing and assembling, shipping, service worldwide, etc. Challenging situation with all these restrictions for all employees. Home Office, how to come to the company, traveling, etc.

Substantial market activity reductions.

35% decrease in demand.

Not much.

Lockdowns on our customer plants, our plants and our suppliers have strained supply chains globally. Today, suppliers are presented with the greatest challenges as other parts of the globe recover faster.

Sales dropped.

Yes, many are working from home. Note: productivity has most likely increased. We use online meetings software, like Teams. Everyone has cell phones.

Sales is the most affected as meeting face to face with customers is very difficult, so, relationship building of trust is somewhat lost. This is also lost from working offsite.

Lost employees both due to furloughs and requests to work on site early in the pandemic.

Delay in final acceptances due to inability of service technicians to travel to sites.

Added extra precautions in day-to-day business.

A lot in spring 2020 but not much now.

Mostly, problems in replacing ill people.

Created a lot of uncertainty

COVID has crushed our Commercial Aerospace business. Thankfully we have significant Defense business with our OEM customers spread over a wide range of aircraft platforms.

Not much until the last quarter of 2020. Now a substantial downturn.

Wiped out most of Q2 production and sales resulting in layoffs/furloughs for our employees.

Increased sick leave.

Pivoted to remote work for office personnel.

2 month shut down.

Business was only slightly off target. Increase in the medical side of the business kept us close to target.

Aerospace and commercial aircraft business was greatly affected.

Fewer orders, manpower problems, material problems.

25% downturn due to some months' production stops.

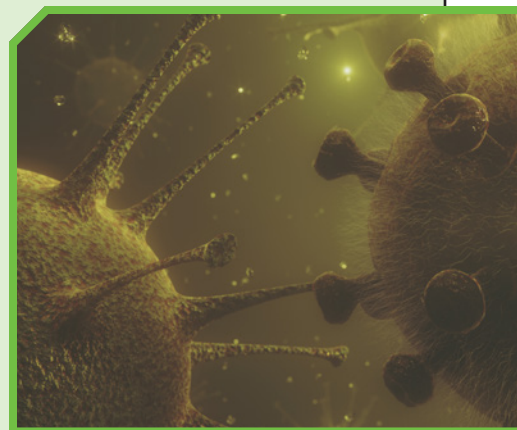
Turnover 2020 ~-20%

Reduction of new projects, regulation of business trips.

Decrease of volume in civil aviation.

Not that much.

In our company COVID pandemic actually comes with opportunities.



Our volume share is increased as many company shifted their supply base from China.

It has affected a lot in terms of business loss, less profit, severe reduction in sales and balance sheet.

Badly.

Heavy absenteeism resulting in sales loss both in-house as well as at suppliers' end.

Reduced sales and employees .

Sales reduction.

Business growth because other countries' factories closed down.

It has slowed us down.

Work stoppage.

Down 17% in 2020.

No effect.

Down 65%.

Five terrible months of new business - April to August.

Sales and profits are down significantly. Customers are not spending the same amount of money.

Financially, mostly.

Not greatly but it has decreased spending by companies, particularly larger projects that were in the works.

Slowed it down 10-14%.

Our customers put a pause on all major maintenance spending.

Slightly.

Postponement of orders with increased costs for COVID compliance.

Very little, fewer personal visits.

Very little aside from the normal PPE use and daily temperature checks and sanitizing.

We had to overhaul how our staff worked, moving much of our office staff to work from their homes. While this was a challenge initially, our team has been resilient to create some better practices (i.e. webinars, paperless efforts). We still have 80% of office staff working from home. As our local schools have not let children attend class in person, this also poses a challenge for employees that have school-aged children should we bring everyone back in the office.

We have not shut down our facility; however, we have slowed down due to temporarily losing affected employees on a regular basis, and due to a reduction in customer demand.

We needed to put in place rapidly health regulations that were totally new before and lots of training too. Happily, our workforce responded well and the COVID impact, so far, has been manageable.

Absenteeism UP.

Slight decrease in sales but we were considered essential service and have remained open with protective measures in place as needed.

Businesses were shutdown, our office employees were working from home. Our shop employees were split into 2 shifts to try to control safe distancing and some of our production hours were spent sanitizing in between shifts to try and combat the COVID the best we could. So our sales and production were affected by that.

Severely. Because of restricted labor volumes in the mining industry the whole industry has been cut by 30-40 %.

It is back to normal now.

Civil aerospace has taken a significant hit as flight hours are only 25% of what they were. Defense aerospace has maintained with a slight increase in business.

Very bad at first beginning with the second quarter but minimal impact into the fourth quarter.

Customers put orders on hold or cancelled. Reduced sales.

Making it hard to have enough people on the factory floor.

Decrease in revenue this past year. During this time we pivoted. We put focus on rebranding, gaining new customers, new sales & increase rate of close. We did a concerted effort to connect with current customers and the partnership needs. We focused on training and retraining skills in our workforce. We used the time to improve.

Stagnated instead of growing.

About 8% reduced due to the lockdowns in many areas.

A lot. Shut down during some periods, generally lack of staff due to sick leave with mild symptoms. Suppliers have not been able to travel to us, to finish machine installations.

Around 25% business decreased, but in third quarter market has picked up and we see good growth in the coming months.

Reduction in sales and in benefits.

COVID had affected us for 45 days but now it's good.

A very unstable business environment continues.

Sales has dropped about 18%. Several employees were out for several weeks with COVID or required to quarantine which has a significant negative impact on production.

More repair, a little less manufacturing for a few months.

Increased overhead and supply cost. Also, made it harder to recruit.

Reduced hours, more time and money on PPE.

Decreased employment.

Low oil prices because of lockdowns has us shut down.

3 months of production stop.

A reduction in production and personnel.

Very little, we ran a limited crew for 1.5 months and it has been wide open ever since.

No effect on workers at this time. Some lost sales.

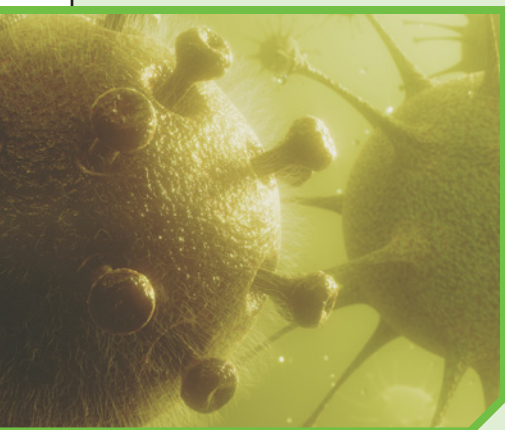
Eliminated sales calls.

Slowed major customers down.

Impacted by a few cases but also people that stayed home in fear of COVID. Some that stayed home to take care of relatives.

Management.

The COVID Pandemic affected sales but has overall brought a better team together to overcome this matter.



**44%**

of Gear Industry Companies saw a decrease in employment levels in 2020.

**42%**

expect employment levels to increase in 2021.

Production levels dropped at

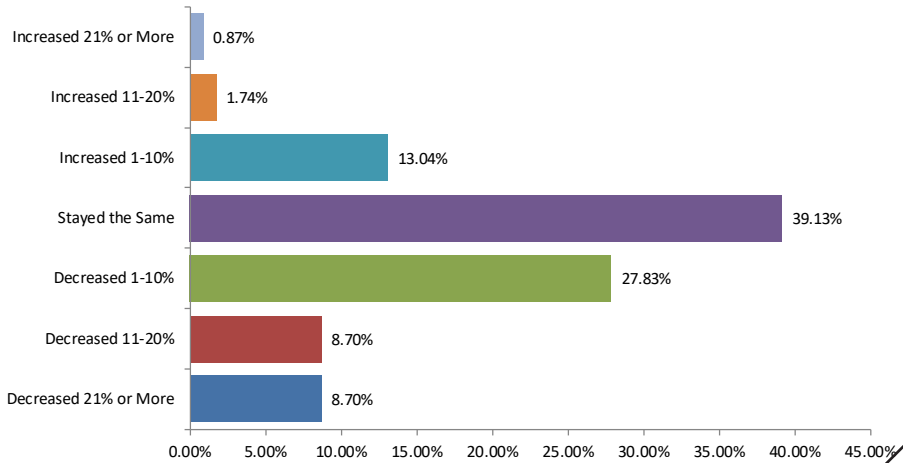
**59%**

of respondents' locations.

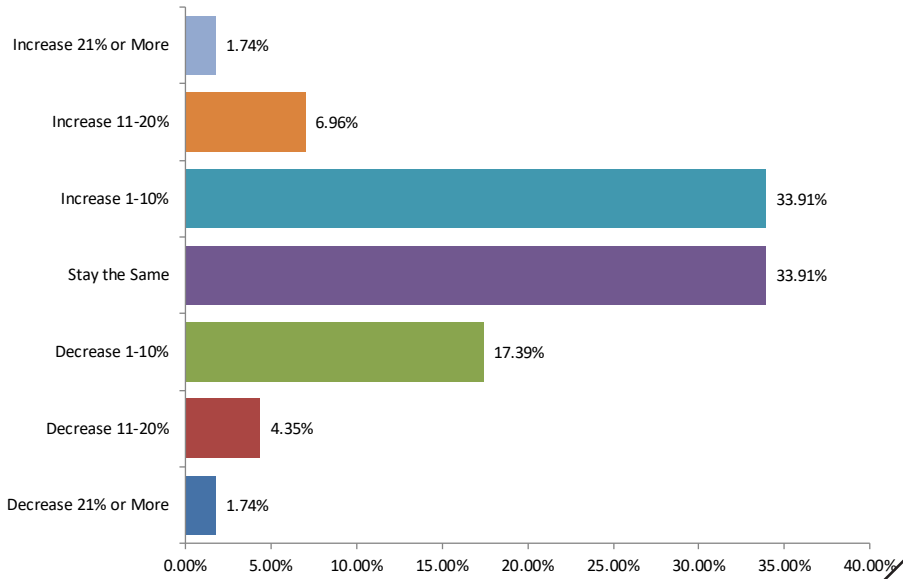
**57%**

expect production levels to increase in 2021.

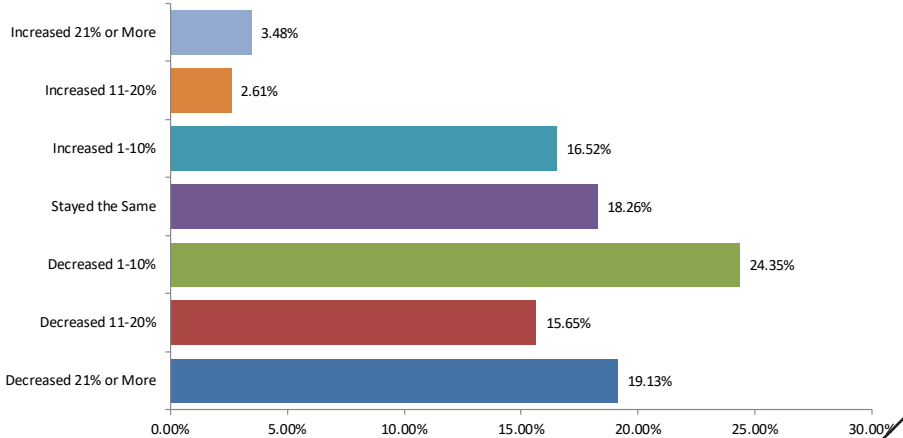
How has your location's LEVEL OF EMPLOYMENT changed over THE PAST 12 MONTHS?



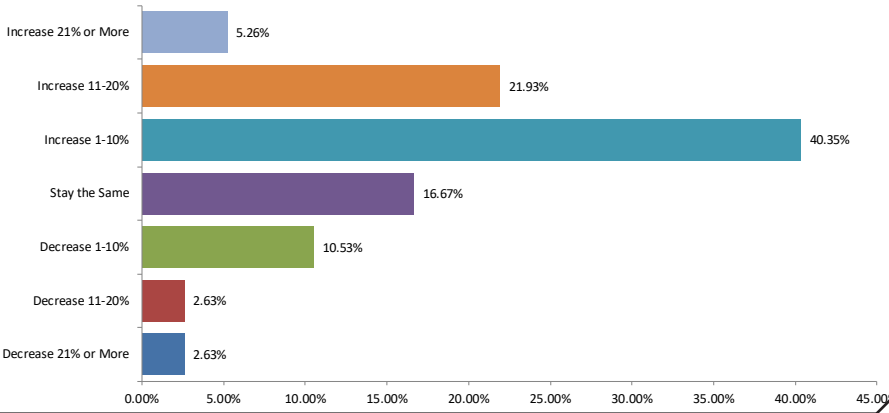
How do you anticipate your location's level of employment will change in the NEXT 12 MONTHS?



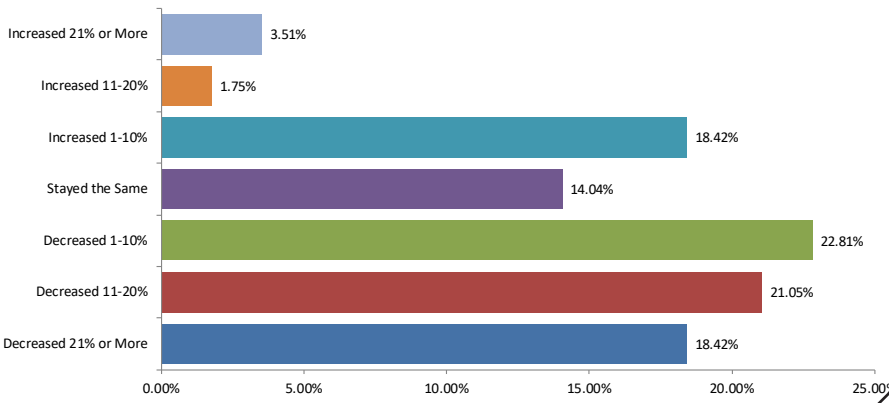
How has total PRODUCTION OUTPUT (unit volume) changed over the LAST 12 MONTHS?



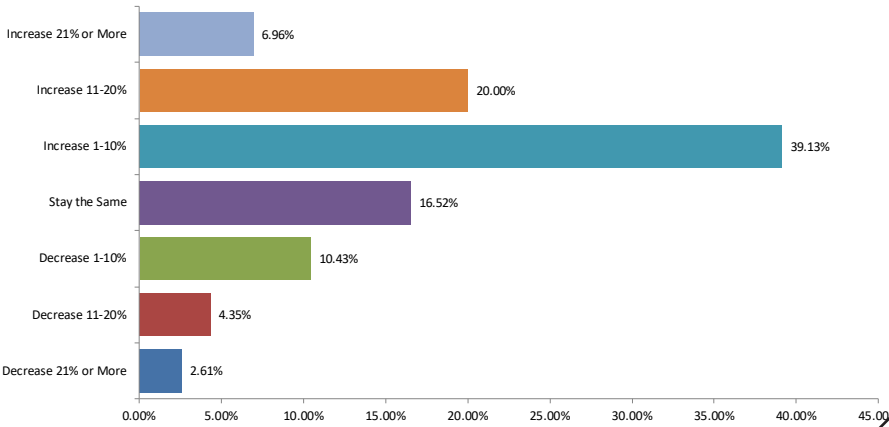
How much do you expect production output (unit volume) to change over the NEXT 12 MONTHS?



How has total SALES VOLUME changed over the LAST 12 MONTHS?

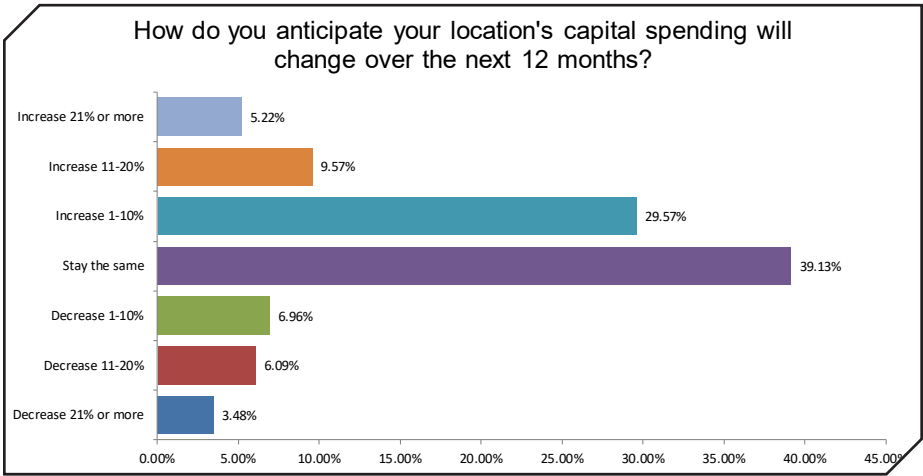
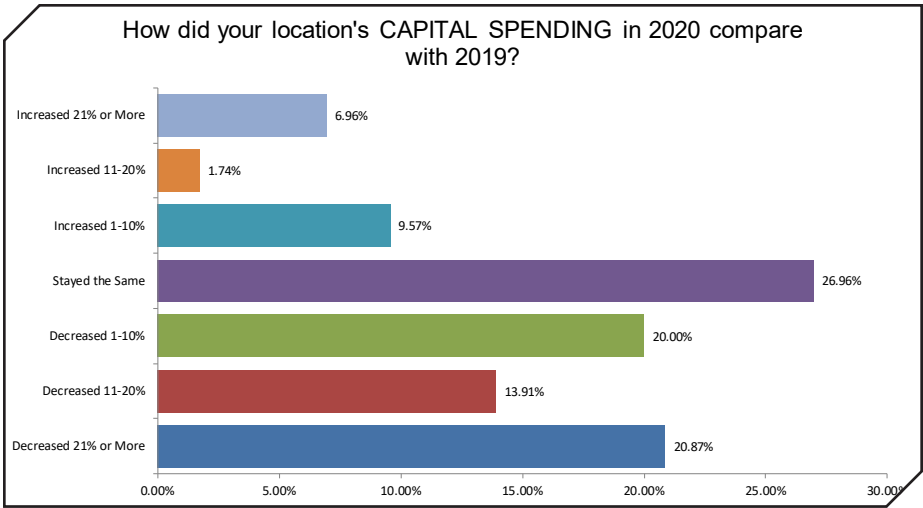


How much do you expect SALES volume to change over the NEXT 12 MONTHS?



Sales decreased at  
**62%**  
of respondents' locations.

**66%**  
expect sales to increase in 2021.



Capital spending decreased at  
**54%**  
 of respondents' locations.

**44%**  
 expect to see capital spending  
 increase in 2021.

**SKILLS**

**What is your company doing to address the skilled labor shortage?**

Automation and moving to nontraditional gear manufacturing processes utilizing standard CNC mills and lathes.

Adapt multiskilling of available manpower.

Apprenticeships.

We speak but take few actions

Initiated skill improvement.

Hiring more manpower.

We employ apprentices. Also import skilled labor.

Recruiting at apprentice level and imparting required training.

There isn't a skills shortage in precision plastic gear industry.

Training in house.

Increase training.

No skills shortage.

In-house skill development and looking for specialized training school.

Good relationships and welfare.

This is not a real problem for our company, due to the high level of our own apprentice program.

In house training of new hires.

Training internally.

Internal training.

Advanced training from within to add competencies. Aggressive hiring strategy to replace critical lost persons. Meanwhile, continued reductions in certain areas are ongoing toward leaner strategy.

We make internal training.

Train people and introduce more machines that require less people.

Just finding people who want to learn is difficult. We are working on trying to hire several. We will use one-on-one training, we have a training program that depending on one's experience can last up to 6 months then one-on-one OJT, and Seminars. This is for design engineers, application engineers and sales engineers.

Training people to improve their skills so that they can take on new roles.

Started using temp agencies to fill

in the gap, doing more training using suppliers as resource.

Recruiting extra people.

Whatever we can.

We have ongoing cross training programs throughout the facility so we don't skip a beat when someone is absent.

Cross-training from various departments.

Increasing the amount of training for current employees and working with local universities to groom potential machinists.

Working directly with colleges to gain access to candidates; Starting apprentice program.

Introducing younger students in manufacturing.

In-house training; More automation with equipment for unattended runs.

Recruitment of skilled manpower.

It's a problem. There's nothing we can do about it. Just look for trained staff, but it's not easy.

Automation.

Training in laptop skills.

Recommendation of correspondence education for employees.

Own apprenticeship department.

Training new apprentices .

We have lot of retention programs in our company.

De-skilling tasks.

Hire trainees from technical schools for short and medium term.

Training.

No solution at the moment.

Advertising and checking with the local community college.

Hope, wait.

Continue to recruit curious "hands on" workers; Promote education with full reimbursement; Promote from within.

There is none.

Training.

Nothing.

In-house training of younger employees with experienced employees.

Full training.

More advanced equipment with less manpower.

Previously, we've hired interns and worked with our local community colleague to educate potential future workers, but COVID has not allowed us to work on these projects in 2020. We will not likely pursue these efforts in 2021 due to COVID.

That is becoming a bigger and bigger problem as we purchase more complex 5-axis machines.

We have a few apprentices... we are addressing it.

Hire and train within.

We are cross training within our organization to improve the skills of our employees, as well as providing support to the local community colleges.

We are hiring more young machinists.

Currently we do not have one due to business shortage.

Encouraging mentoring and helping less experienced employees.

Cross train and develop younger talent.

“Advanced training from within to add competencies. Aggressive hiring strategy to replace critical lost persons. Meanwhile, continued reductions in certain areas are ongoing toward leaner strategy.”

We are endlessly training new workers and associates and transforming them into talented people.

More \$ for the same jobs

Not much we can do to address the skills shortage; Luckily we have gotten some good candidates and interviewed them thoroughly and they appear to be working out so far. I think that may be due to the pandemic and some good people being out of work because of it.

In-house training is ongoing. Apprenticeships have been suspended.

Training internally, bringing people in from other countries.

Owner working more hours.

Difficult issue, need in-house training for 2 years .

Internal training along with partnership with vocational schools.

Little of which I am aware.

Actively working in the local schools, county and state.

Training.

Offer paid training (employ people without necessary education, and pay them during it). Long term competence development plans, including support to schools and universities in the area.

Nurturing young talent and conducting training classes .

Internal and external training mainly.

Training.

We are struggling to improve the system for productivity such as ERP, PLM, Manufacturing process, etc.

Cross training or outsourcing when needed.

Expand internal training resources.

We provide on-the-job training for required skills.

More in-house training.

Internal training program.

We educate in house.

We have all we need. None.

Nothing.

Automating wherever possible.

Hiring skilled professionals and good interns to train under them.

Working with Jr. Colleges; Working with the military.

Hire and train new workers.

Internal training.

Hiring from trade schools; paying for continuing education; internal training.

Nothing. It has been years since they have done anything.

We are continuing to recruit qualified employees as well as continuing to cross train current employees.



## Significant Trends

What are the most important trends affecting the gear industry in 2021, and what should our readers know about those trends?

Hard finishing on gears, specially honing on stepped gears. 100% measuring in line with possibility to use the complete part tolerances.

Lack of qualified operators leading to need for automation

Need for flexibility as lot sizes get smaller.

### ELECTRIFICATION!

In India after the pandemic the demand for mechanical aggregates has drastically dropped hence the gear demand. Traditional gear manufacturing companies can't survive during these tough times.

Innovative production process, optimum manpower minimum machines but able to supply during surge in demand and not to incur losses during slump period.

For us, electrification is an opportunity. Hybrid and e-drive transmissions help us justify the use of our products - which is a clear plus.

Automation.

Lack of competency at the top level of company, when technical companies are managed by the finances, it can become catastrophic.

Electrification of the car.

1. Problems with maintaining the supply chain. 2. Higher prices of materials for production. 3. Higher electricity prices.

Industry 4.0.

Smart Manufacturing.

In India, Base work at Automotive companies on electric vehicles will be kick started/ in-progress. In general the use of gears in EVs is limited compared to diesel counterparts. Still the use of EVs across the globe will be a distant dream. Hence use of gears (of current volumes) will further continue for some more years to come.

EV demand for global market in 2021.

Quality product supplied on-time; this never changes. Electric vehicle drives increasing.



New Projects and Expansions.

Magnetic gears.

Plastic Gears.

I'm hoping robotics sector will continue to grow because I make precision molded gears.

Customers are waiting for business to start up after the pandemic. In the meantime, they would prefer to keep with same units. The smart ones are taking advantage to be prepared for the future.

Training personnel and retaining them.

Electrification forces many changes in capacity and size capability for many manufacturers. I am a machine tool rep and think much change will be forthcoming.

The economy running slowly.

Biden.

Less demand for gears due to electrification.

Electric motor drive gearboxes.

Reduction in volumes. Competition from Asia.

Gears and transmission systems coming from Electrification of vehicles.

Rising steel cost, high technology cost, low penetration training technicians, minimum understanding on Heat Treatment process.

Finding the right people.

Less companies but more skills.

Car & Truck sales.

Wind power will strongly come back; in E-Drive technology the hydrogen vs. battery discussion will be pushed forward; in many gear applications the quality requirements are on such a high level, that the physical limit is nearly reached; a faster and faster gear manufacturing will be still required, so new tooling and machine techniques have to be developed; Co2-neutral manufacturing will be broken down to the machine tool and where its electricity comes from.

COVID.

Additive manufacturing, 3D modeling software, simulation software, composite structures and new materials will completely transform the Gear Industry as we know it. It will also transform bearing technology.

My company supplies automotive gearing. Automotive powertrains are undergoing transformation with the introduction of electrification. Electrified powertrains have significant reduction in amount of gears to be produced. This means the market will become extremely competitive. My company is constantly developing and working on new production technologies, many of which can help to produce these new gear designs and allow cost & space saving measures. For this reason, I am fairly optimistic for our future over the coming short term outlook.

Supply side economics. At least here in the USA.

Electrification of vehicles. We believe, this means greater demand for in-line gear measurement.

1. Electrification: the change of technology as well as entering in a new technology and still a not 100% known structure of production has frozen the new project specially for the automotive industry, causing the drop down on the sales; 2. COVID-19: the pandemic has also influenced some delays of projects since beginning of 2020 and is still influencing postponing many projects.

For the bevel gear set we see a big interest in the teeth finished by grinding. For the gears in general we see a high attention to the washing operation.

Automation in inspection techniques and condition monitoring of operating gears with IOT (Industry 4).

I think with the new electrical system the business of gears will be damaged because we will use more electrical parts and fewer gears.

Commercial Aircraft is down! Military Defense and Space is up!

Increasing power density and downspeeding for heavy duty vehicles is putting more stress on the lubricant and increasing lubricant temperatures. Therefore more robust and higher performing additives are needed to ensure sufficient parts lubrication to minimize wear and reduce operating temps. The slow transition from hypoid gears to e-axles in battery and hybrid vehicles will require development of new additives and compatible fluids.

I see more problems in the training of CNC operators than in any external threat called COVID-19 or recession. As long as there are people who like to do their job well, there will always be someone who needs it.

Gear units are being bought based on price. If the "catalog" says it rates and it is low cost. So what if it only lasts for a couple of years? Offshore competitors are killing the USA gear manufacturers. Did anyone say dumping?

Lack of high volume programs in US limit opportunities for multi-machine sales. Tighter tolerances and acceptance criteria of EV technology coupled with a low rate of market expansion are driving need for R&D in face of low equipment sales. Customers are considering automation to address labor shortages but are hesitant to invest due to pandemic uncertainties and reduced cash flow in 2020.

We, as customers, are looking for better efficiency, better quality, and better longevity for the gear units. This, of course, must be based on how well the end-user maintains their equipment.

Lack of employees.

In my opinion the most important trend to follow in 2021 is how the COVID-19 pandemic behaves worldwide. The world economy may take time to reactivate if the infections do not subside or if the vaccines do not reach everyone as quickly as desired.

Shortage of people who want jobs. Raw materials to produce gears. Steel market.

Move towards electrification will increase gearmotor requirements and variety.

Outsourcing of manufacturing (and with it, knowledge) to lower cost countries. Less emphasis in U.S. universities on core mechanical disciplines in favor of bio- and nano-engineering.

Noise level to be reduced.

Profile modification.

Environment - dry cutting.

Lack of trained/skilled machinists to run our equipment.

We need the new administration to continue to promote "Buy American" and "Build It In America"! If the trend reverses we are all in trouble. Too much Automotive, Aerospace and Industrial is outsourced to foreign lower cost manufacturers under the veil of U.S. companies who in turn outsource to their own or other low-cost manufacturing facilities to compete. Made in America should mean just that. Made In America! For example, the Commercial Aerospace Industry is obviously at an all-time low. When the economy comes back alive and the airline industry returns to pre-COVID days, the U.S. gear suppliers should reap the benefits, not the foreign gear suppliers. Too many of the U.S. Aerospace OEMs have offshored products to Mexico, Eastern Europe and Asia. Keep the work in America.

Supply levels are abundant due to technology, and market demand hasn't increased through new industries.

Conversion to electric motors and transmissions.

What the impact of vehicle electrification will be along with what decisions will be made by the Biden administration regarding taxes, regulations, COVID-19.

Additive Manufacturing and milling of tooth forms on non-dedicated machines.

Cost of labor. Electrification. Pace of the increased use of E drives vs. conventional powertrains.

Electrical cars.

E-mobility with their new gearbox designs.

Noise Topics (NVH), Electric Vehicle Gearing, reshoring and the continuation of increased automation.

Reshoring will give us all more opportunities to compete.

Due to the increasingly difficult task of finding skilled labor, unattended running through shifts becomes more important than ever.

Custom tooth profiles. No burr machining. Fine pitch.

Helical gears trends are changing to Heli-bevel Gear. Also BLDC motors providing low rpm & torque. Motors with VFD providing challenges. Noise & vibrations generated in gear operations are threats due to silent operations requirement by customer. Lubrication requirement is burden to user. Hence magnetic gears with low price workout will provide better solutions in future.

**E-mobility**

**Demand for high energy efficiency**

**Reliability of GEARS. Green energy. Construction equipment is getting a good response. Electrification - Less need for engine timing gears & transmission gears. Electrification needs fewer gears in weight but more complicated versions.**

**Shift to low-cost companies are affecting our plants in high wage countries. Strong comeback of demand. Crucial to avoid bottlenecks in supply chains. Military aviation.**

**UAVs.**

**Business jets. Trends in environmental issues. Automotive market, how fast do they pick up again? How fast will Europe and America recover after the COVID Crisis?**

**COVID.**

**Gear Industry in India is preparing to equip to meet the quality requirements of gears for electrical vehicles. However, the renowned gear manufacturers in India also are not fully aware of the specific quality requirements of those gears. As such, it is very important for them to upgrade the knowledge & to modify their facilities accordingly, as soon as possible. This is very important for them to be able to switch over to manufacture those gears without associated risks.**

**Electric Vehicles do not need a transmission like the AT or DCT. The electric powertrain needs only 4 gears. The current gear production requirements will be down during the next years.**

**The pandemic.**

**EV Gearbox technology is affecting the gear industries a lot and this will continue in 2021.**

**Tooth Honing and tooth grinding processes are in major focus. Trend of LNS (Low noise shifting) Grinding is become more popular.**

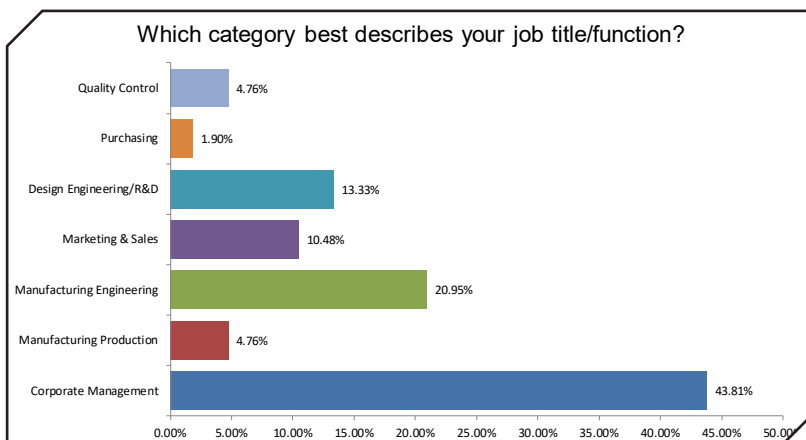
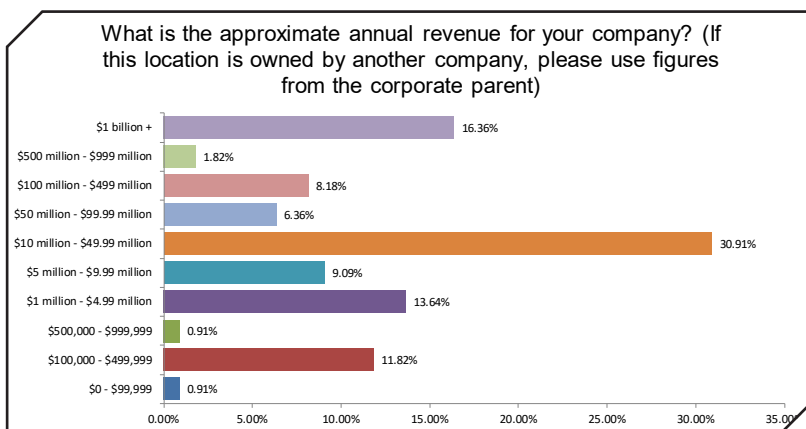
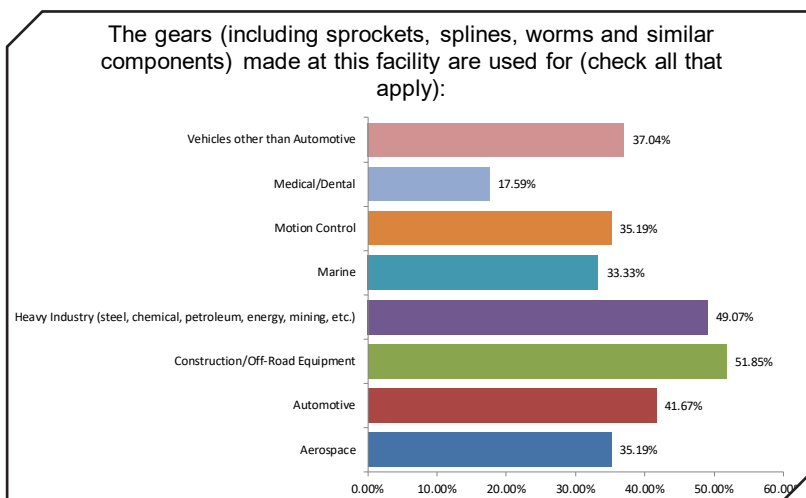
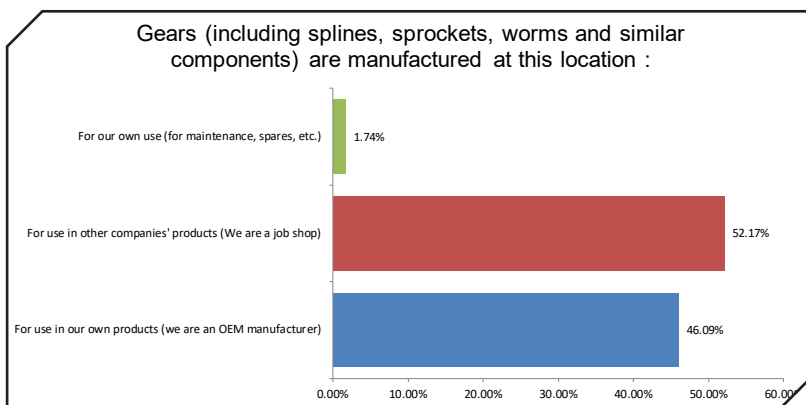
**Optimizations in Profile and Lead angular errors in focus.**

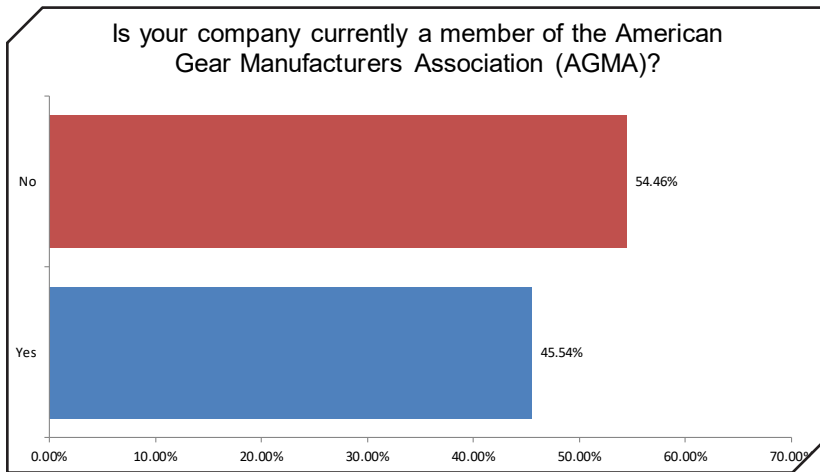
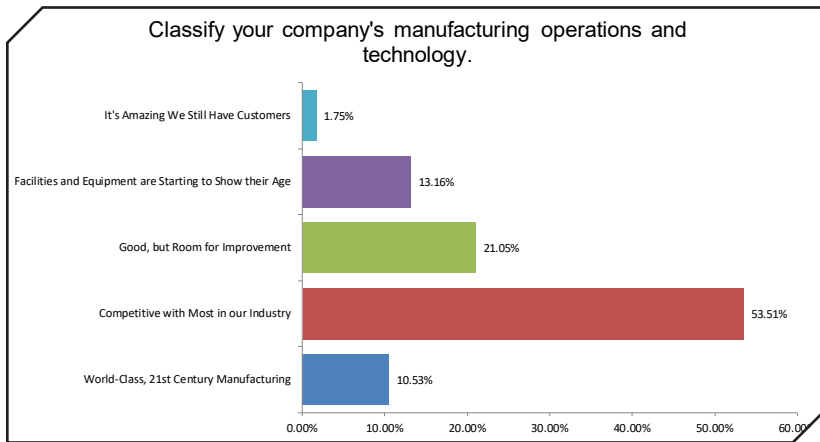
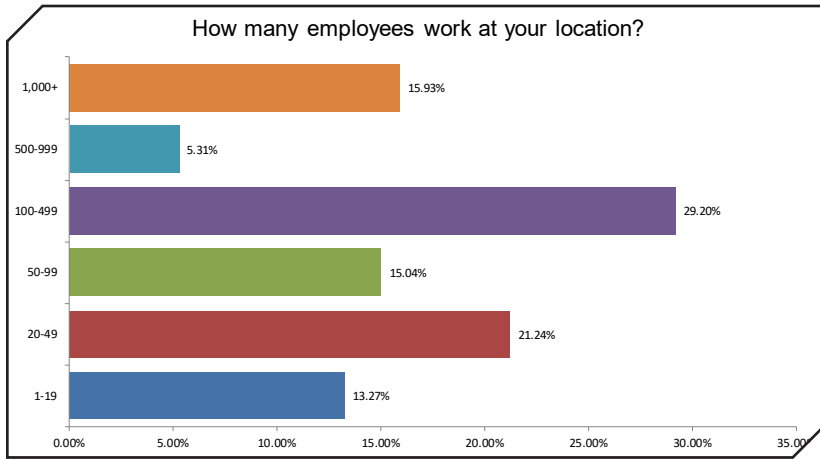
**Electrification, and Energy Generation.**

**Focus on service, focus on virtual meetings, and monitoring expenses.**

**PM development, 3D printing.**

**DEMOGRAPHICS**





**Thank you to the hundreds of participants who answered our survey. Your contribution is much appreciated!**

For Related Articles Search  
**State of the Gear Industry**  
 at [www.geartechnology.com](http://www.geartechnology.com)

**1. Sales of Agricultural & Construct equipment on rise. 2. Transition to quieter gear box. 3. Cost competition.**

Joe Biden will sell out to China and it will make it harder for all of us to find work. He will continue to pass out free money from the government and you'll never be able to hire entry level employees.

Integrated inspection, feedback control systems. Staying up to date and competitive.

Epidemic situation and Sino US relations; Large-scale; high precision; Strong Automotive demand.

The out of country sourcing is ruining companies.

Quality & reliability. The improvement in technology regarding the machinery in a gear cutting process. Economic effects from pandemic.

We shall design more lean system of rack and pinion steering system for cars, extremely the strength and fatigue performance.

No new technology advancement due to economy stagnant.

Reshoring - we see more gear manufacturing coming back to North America from Asia in 2021. E-drive - new automotive manufacturers with no gear manufacturing expertise are shopping for gears creating new opportunities for gear manufacturers.

Transition from gears alone, to power transmission solutions providers.

Retirement of family-owned businesses and both their leaders and aging employees.

5-axis machining - the future. Health care costs. Cost of living. Inflation.

Material availability, specifically high quality steel bar. Performance and racing vehicles. Continuing emergence of China as a major manufacturing force. Internal gear skiving.

Bookings for the industrial market are starting off slow. We're not seeing many inquiries. It's still very slow. Seems like OEMs aren't doing as many new projects as of yet. Likely what happens with our political climate is a key factor with so much drama going on in the U.S. We have seen some reshoring opportunities due to the U.S. being so resilient with operations during the COVID pandemic, however.

We do have concerns for 2022-2023 for the defense market, which has been a saving grace for 2020 and going into 2021 bookings. Democrats have a strong track record of cutting defense budgets. Not sure if commercial aero will be back by that time to offset potential declines in the defense market.